

EXHIBIT A:
FBS Joint Storm Damage Report



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Joint Storm Damage Report

for



**Forest Ridge Homeowners Association
1551 Yellowstone Drive**

Streamwood, IL 60107

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Client: Thompson Brody & Kaplan

Project Address:

Forest Ridge Homeowners Association
1551 Yellowstone Drive
Streamwood, IL 60107

Cook County

Insurance Carrier: Greater New York Mutual Insurance Company

Insurance Policy Number: 112M35542

Insurance Claim Number: F0675415-01

FIELD REPORT FOR INITIAL STORM DAMAGE INVESTIGATION

1.0 Background Information:

Forensic Building Science, Inc. (FBS) was retained by Forest Ridge Homeowners Association and its representatives Thompson Brody & Kaplan Law Firm to provide an inspection of the above-mentioned properties to ascertain the extent of damage caused by wind and hail, which was reported to have occurred on August 2, 2015. Our inspection was limited to damage to the roofs and exterior cladding.

1.1 Reference Information on August 2, 2015 Storm Event:

Roofing Consultants Report identifies a site-specific hail report from CoreLogic which indicated the following:

“... a hail event on August 2, 2015 that produced 1" hail. Slightly larger hail was recorded within 1-3 miles of the loss location, but those stones reportedly only reached 1.1”. There was 1.8" hail within 10 miles of the loss location.”

Note: RCL report does not give an opinion on the date the observed hail damage occurred.

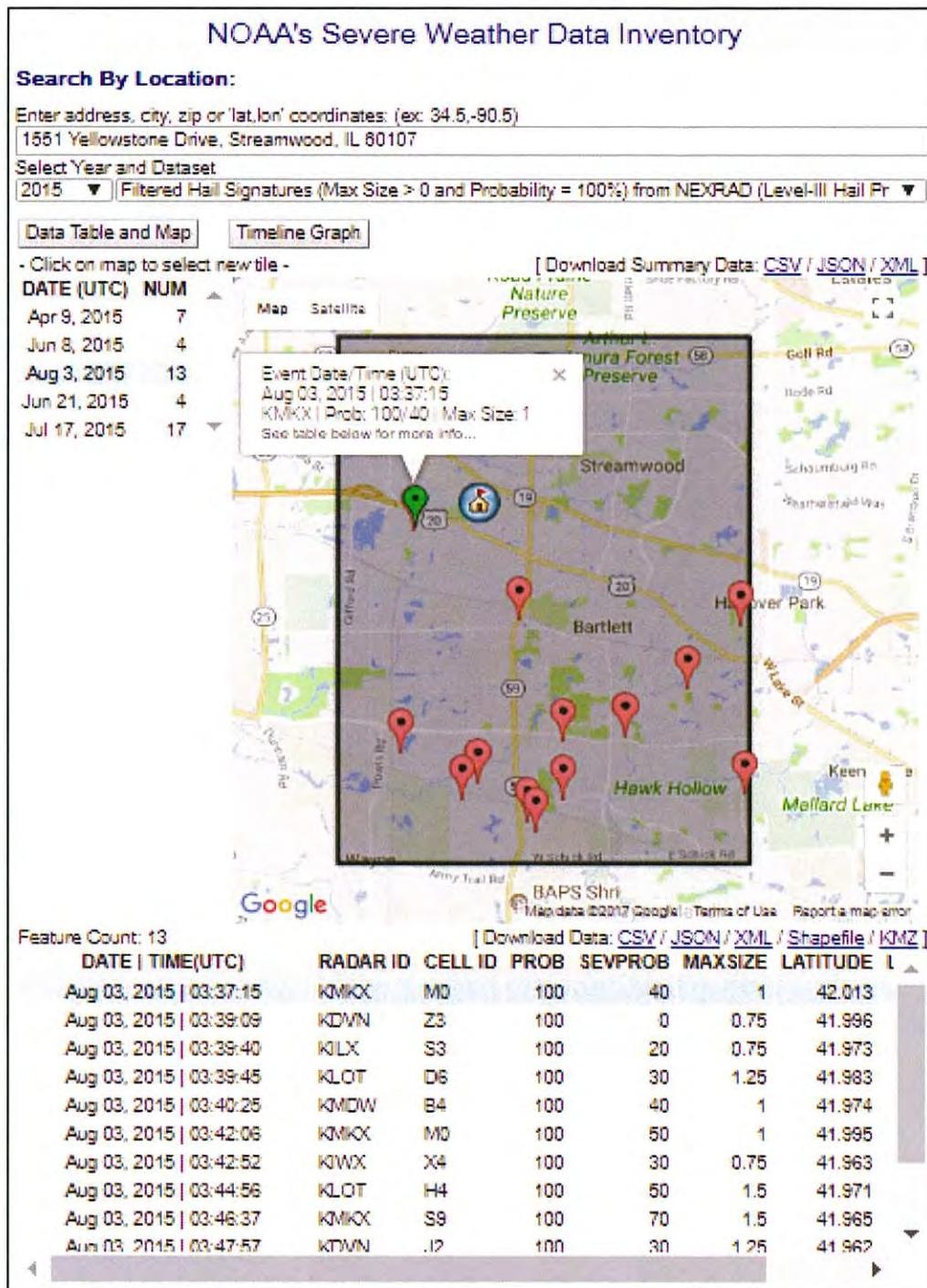
1.2 NOAA Storm Events Database

1.5" hail reported 3.8 miles south of the property on August 2, 2015:

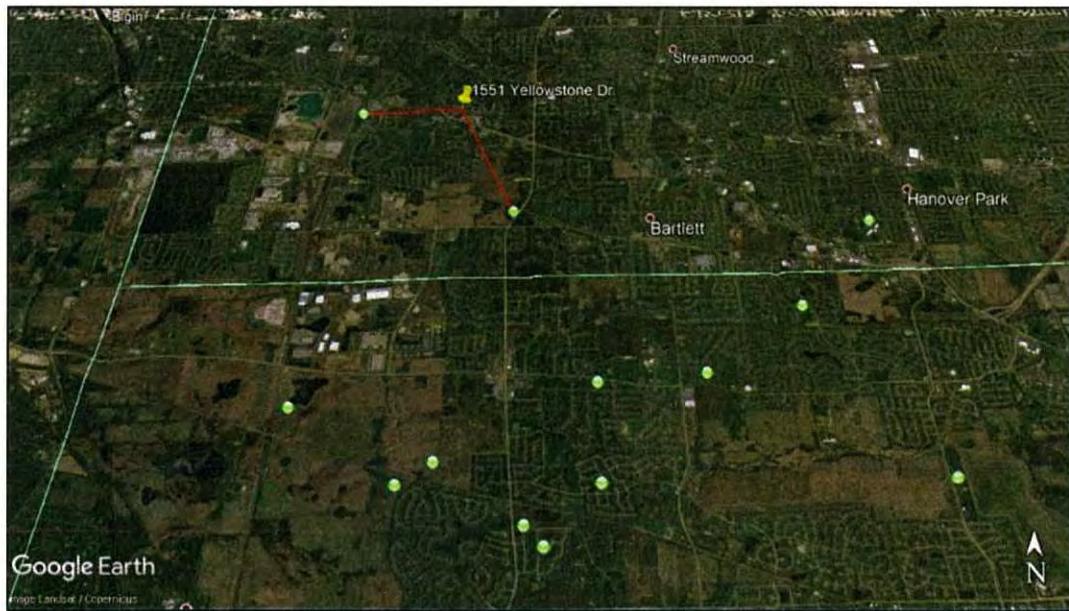
Event Details:

Event	Hail
Magnitude	1.50 in.
State	ILLINOIS
County/Area	DU PAGE
WFO	LOT
Report Source	CoCoRaHS
NCEI Data Source	CSV
Begin Date	2015-08-02 13:20:00.0 CST-6
Begin Location	1SE MUNGER
Begin Lat/Lon	41.96/-88.2
End Date	2015-08-02 13:20:00.0 CST-6
End Location	1SE MUNGER
End Lat/Lon	41.96/-88.2
Deaths Direct/Indirect	0/0 (fatality details below, when available...)
Injuries Direct/Indirect	0/0
Property Damage	0.00K
Crop Damage	0.00K
Episode Narrative	An isolated supercell developed over north central Illinois and moved across portions of the Chicago metropolitan area during the afternoon producing strong large hail and severe winds. A man was killed at an outdoor event in Wooddale when a large tent collapsed causing a beam to strike the man. An estimated 20 others were injured, including three seriously. Additional thunderstorms formed later in the evening producing severe weather, including a tornado near Grayslake.

1.3 NOAA Severe Weather Data for Filtered Hail Signatures on August 2, 2015:

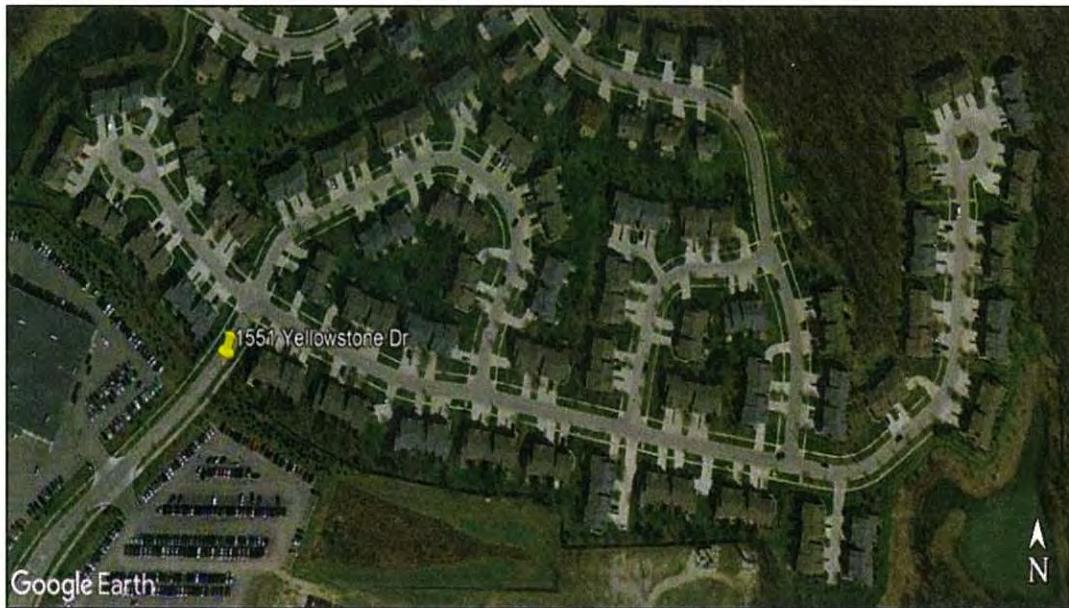


Note: Times are listed in Universal Time (UTC), which is 5 hours ahead of Streamwood's Central Time. Therefore, reported time of 03:37 on August 3, 2015 can be converted to 22:37 on August 2, 2015.



Google Earth imagery of filtered hail signatures (green dots) reported on August 2, 2015. The hail signature to the west is 0.85 miles away from the property and the hail signature to the southeast is 1.30 miles away from the property.

1.4 Satellite Image of the Property:



Google Earth Imagery after the storm event dated April 7, 2017.

FBS personnel visited the site to take photos and document damage to the location(s). These photos are attached to this report.

1.5 FBS personnel and other parties present for this inspection:

- Brian Johnson P.E. Sub Consultant for FBS – October 16, 2017
- Kevin Steinke, FBS, Field Investigator – October 16, 2017
- Hannah York, Sub Consultant for FBS – October 16 through 20, 2017
- Tom Irmiter, FBS, Founder & President – November 9, 2017

1.6 The following documents have been received:

- JS Held Construction Consulting – RCV Estimate of Repair (\$1,469,149.19), dated June 28, 2016
- York Specialized Loss Adjusting – Report #3 dated August 8, 2016
- York Specialized Loss Adjusting – Report #4 dated September 13, 2016
- York Specialized Loss Adjusting – Report #5 dated October 12, 2016
- Roofing Consultants, Ltd. – Roof Investigation Report dated October 17, 2016
- Powerhouse Restoration, Inc. – RCV Estimate of Repair (\$2,370,557.61), dated July 24, 2017
- 28 photos from client along with developer's map and address list

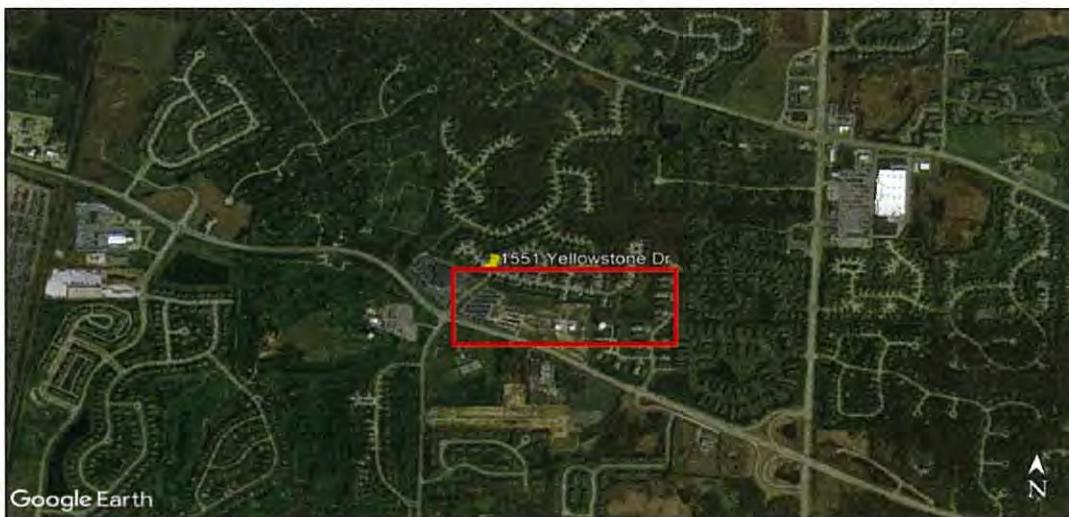
1.7 The following additional documents were used for reference:

- According to the Village of Streamwood, IL website, they adopted the following codes as of June 1, 2017:
 - 2012 International Building Code with local amendments
 - 2011 National Electrical Code with local amendments
 - 2012 International Mechanical Code with local amendments
 - 2012 International Property Maintenance Code with local amendments
 - 2012 International Energy Conservation Code with local amendments
 - Amendments can be found here:
<http://www.streamwood.org/Services/Community-Development/Building-Department/Codes-and-Regulations.aspx>
- CertainTeed Shingle Applicators Manual, 13th edition.
- Haag Education Haag Certified Roof Inspector Program, Residential Edition.
- Ventilation and Moisture Control for Residential Roofing, ARMA Technical Bulletin 209, retrieved 6-26-12.
- Nail Application of Asphalt Shingles for New and Re-cover Roofing, ARMA Technical Bulletin 221, retrieved 6-26-12.
- Asphalt Roofing Shingles: Composition, Performance, Function, and Standards, Raymond McNulty, January 2000 Interface magazine.
- Hot Weather Recommendations for Storage and Application of Asphalt Roofing Shingles, <https://asphaltroofing.org/wp-content/uploads/2017/05/Recommendations-for-Storage-and-App-of-Asphalt-Roofing-Shingles-in-Hot.pdf>
- Re-roofing: Tear-off vs. Re-Cover, ARMA Technical Bulletin 223, <https://asphaltroofing.org/wp-content/uploads/2017/11/Reroofing-Replacement-vs-Recover.pdf>
- Cash, Carl and Edward Lyon, "What's the Value of Ventilation." Professional Roofing Magazine, March 2002.

- ASTM D6381-08 Standard Test Method for Measurement of Asphalt Shingle Mechanical Uplift Resistance.
- ASTM D3161-16a Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method).
- ASTM D7158-11 Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method).
- Self-sealing Asphalt Shingles – Technical Bulletin 3.0 – Is My Roof Wind Damaged? Is Wind the Proximate Cause, Donan Engineering, January 2009.
- Assessing water damage to gypsum board, Gypsum Association GA-231-06.
- Relationship between Moisture Content and Mechanical Properties of Gypsum Sheathing- Phase 2 Research, by Alex P. McGowan, from the 11th Canadian Conference on Building Science and Technology, Banff, Alberta, 2007.
- Panel Edge Support for Narrow Width Roof Sheathing, APA Technical Note R275A, Aug 1997.
- DuPont Tyvek Water-Resistive and Air Barriers Installation Guidelines – Revision 3/17. <http://www.dupont.com/content/dam/dupont/products-and-services/construction-materials/building-envelope-systems/documents/K16282-Residential-WRB-Install.pdf>
- Vinyl Siding Installation Manual, *Vinyl Siding Institute*, Dec 2011.

1.8 The property consists of a total of fifty-one (51) wood-framed, 3 and 4-unit, multi-family condominium buildings in the development. The buildings are 2-story structures with a cross gable roof design where each unit has its own attached garage. The majority of the roof coverings are approximately ten (10) years old. The roofs are covered with fiberglass composition three-tab shingles and were typically colored either gray or brown. The general design of the roofs shared the same physical characteristics. Exterior wall finishes consist of brick and vinyl siding.

2.0 Inspection Notes:



Google Earth Imagery after the storm event dated April 7, 2017.

- Area is surrounded by open terrain to the west, single and multi-family

residential properties to the north and east and some commercial properties to the south, which is consistent with the definition of Exposure B in ASCE 7.

- Roof Sheathing: Plywood/OSB
- Valley: Closed, cut
- Roofing Type: One layer of three-tab strip, self-sealing shingles
- Shingle Length: Most were 36". Some measured 35.625"
- Shingle Exposure: 5"
- Fasteners: 4 nails/shingle
- Underlayment: #15 felt
- Roof Pitch: main roofs 5"/12" and dormers 7"/12"
- Ventilation: continuous shingled-over plastic ridge vents, spaced louvered soffit panels and isolated gable vents
- Drip Edge: Installed
- Crickets: None, no chimneys observed.
- There are gutters and downspouts on each building.
- Gutter apron on all buildings.
- Typically, a space between the apron and the underlayment, exposing decking.
- Grey/Black shingles 25 year.
- Red/Brown shingles 30 year.
- Varying amounts of hail damage found on all roofs.
- Impact damage to vinyl siding, soft metals, window trim, screen, and A/C condenser coils on all buildings. Some A/C units with protective coverings, others on leeward side (protected by the building).
- A few exposed fasteners were observed where shingles have been broken and/or displaced.
- Some detached siding, creased and torn shingles and missing shingles were consistent with wind damage.
- Tyvek behind vinyl siding at some areas. Some areas do not have a WRB.
- Plywood wall sheathing behind the vinyl siding.

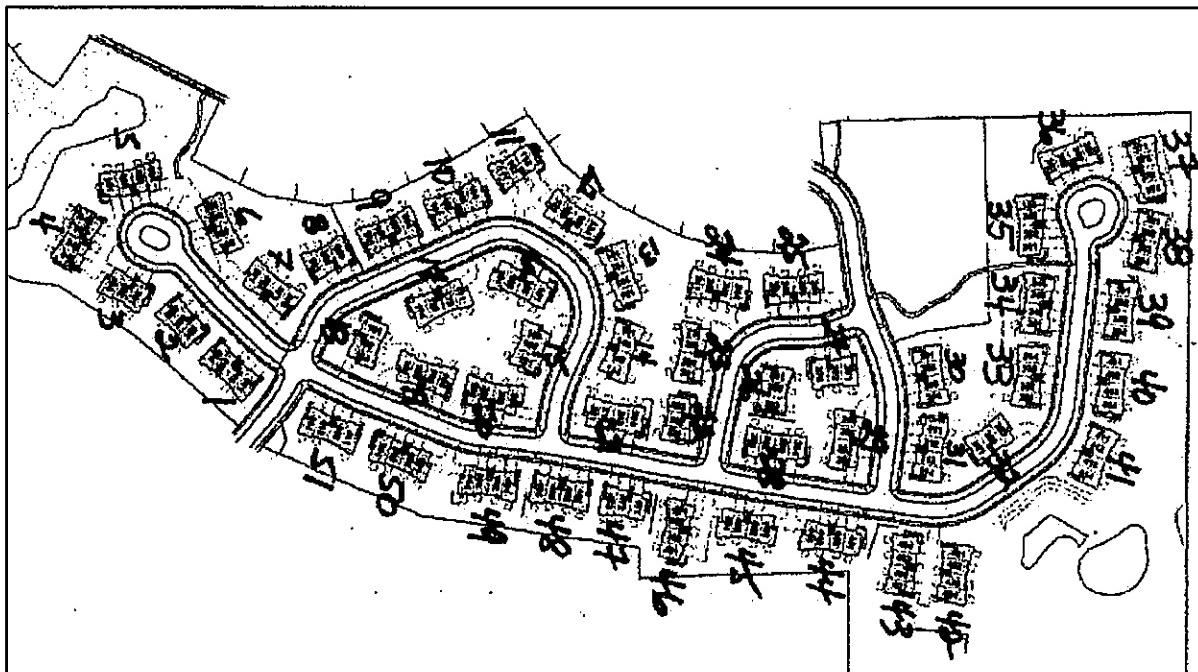
3.0 Site Observations:

- 3.1 Design and construction of the buildings is similar in all cases. Roofs are cross gable-style with varying levels at roof jumps.
- 3.2 While there are no manufacturer's identified, installation was consistent with other roofs of this type and design we have inspected.
- 3.3 Generally, the types of damage we observed on most buildings, which consisted of the following, was consistent with dense/hard hail, no less than 1" in size from the reported storm event:
 - Impact damage to shingles of roof. Some impact damage was so severe that the fibers of the mat of the shingle were visible. RCL report indicated the same.
 - Mat fracture.
 - Chipped shingles.
 - Creased shingles.
 - Broken and torn shingles at rake edge and in the field.

- Missing and displaced shingles.
 - Non-matching replacement shingles have been used in some areas for temporary repairs.
 - Impact damage to gutters and downspouts.
 - Impact damage to metal trim.
 - Impact damage to vinyl siding.
 - Impact damage to A/C units.
 - Damage to window screens.

3.4 Roof and Siding Inspection

Each roof was fully inspected. 10' x 10' and 5' x 10' sample squares were used to quantify the damage. This method was used to inspect 100% of the roof on all 51 buildings. Damage on all roofs was consistent with the storm event. In our opinion, 1" hail fell at the site on the August 2, 2015 date of loss. Some of this hail was larger. The hail was dense and hard based on the depth of the indentations and fractures. The extent of damage varied as one would expect. See photo logs sorted by building for documented storm damage.



Forest Ridge Site Map with buildings numbered.

3.4.1 Building #1 (1551 – 1557 Yellowstone Drive):

- Impact damage to window screens.
 - Impact damage to gutter.
 - Missing shingle tab.
 - 20+ impacts identified on the south facing roof slope.
 - 20+ impacts identified on the north facing roof slope.



Figure 1.



Figure 2.

3.4.2 Building #2 (1561 – 1565 Yellowstone Drive):

- Impact damage to vinyl siding.
- 20+ impacts identified on the south facing roof slope.
- 20+ impacts identified on the north facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter.
The following observations were made at that time:
 - Front Center area: 10+ impacts from hail.
 - Back: 12+ impacts from hail.
 - Siding pulled back: No manufacturer identifying marks found.
 - Siding in contact with roofing.



Figure 3.



Figure 4.



Figure 5.

3.4.3 Building #3 (1571 – 1575 Yellowstone Drive):

- This building inspected on October 16, 2017 by Brian Johnson, P.E. and Kevin Steinke. The following observations were made at that time.
- Impact damage to gutter and downspouts.
- Impact damage to metal light fixture (see fig. 10 of photo log).
- Impact damage to vinyl siding.
- Detached vinyl siding identified.
- Small part of roof tarped over.
- Missing shingle tab.
- 20+ impacts identified on the south facing roof slope.
- 20+ impacts identified on the north facing roof slope.



Figure 6.



Figure 7.

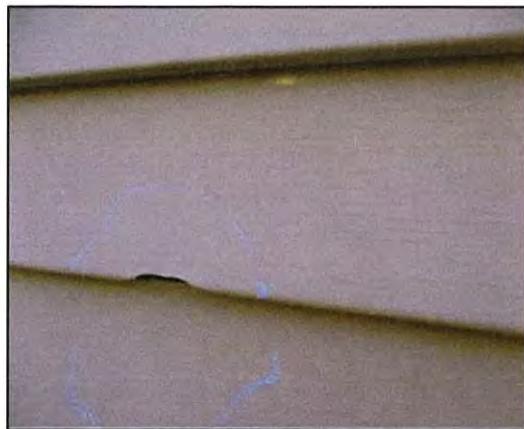


Figure 8.

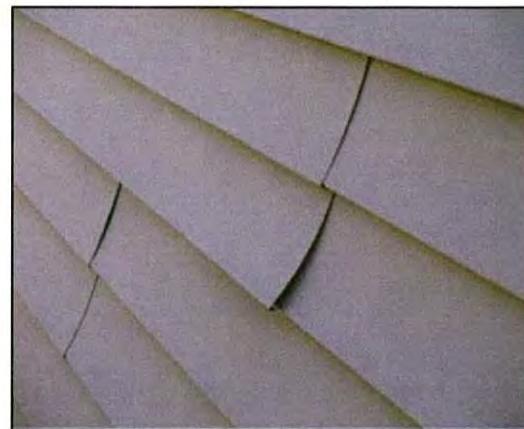


Figure 9.



Figure 10.

3.4.4 Building #4 (1581 – 1587 Yellowstone Drive):

- Impact damage to vinyl siding.
- Impact damage to gutter.
- 20+ impacts identified on the east facing roof slope.
- 20+ impacts identified on the west facing roof slope.



Figure 11.



Figure 12.



Figure 13.

3.4.5 Building #5 (1580 – 1586 Yellowstone Drive):

- Impact damage to gutter and downspout.
- Buckling of the roof deck was observed.
- Tarped off section of roof slope observed.
- Impact damage to drip cap above window.
- 20+ impacts identified on the southeast facing roof slope.
- 20+ impacts identified on the northwest facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter.

The following observations were made at that time:

- Front: 7 impacts from hail in a 5 x 10 area
- Back: 13 impacts from hail in a 5 x 10 area
- Tarp on part of roof
- Mechanical – Foot traffic damage on front
- Visible nail at one location
- 1-inch spatter on concrete window sills, Telecom. Equipment,
- Chips on decking
- Siding damage on right elevation
- Downspout damage



Figure 14.



Figure 15.



Figure 16.



Figure 17.

3.4.6 Building #6 (1560 – 1566 Yellowstone Drive):

- Impact damage to gutter and downspouts.
- Detached vinyl siding identified.
- Mechanical damage to shingle identified.
- 20+ impacts identified on the southwest facing roof slope.
- 20+ impacts identified on the northeast facing roof slope.

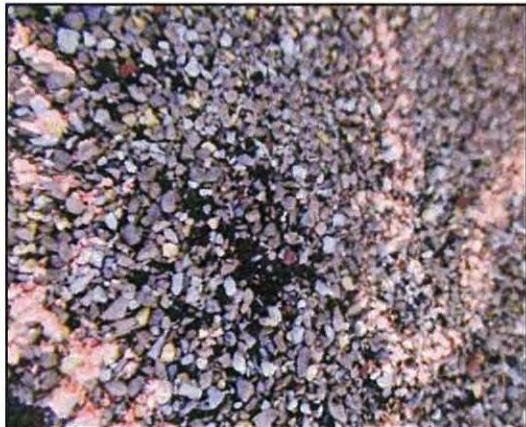


Figure 18.



Figure 19.



Figure 20.

3.4.7 Building #7 (1550 – 1556 Yellowstone Drive):

- Impact damage to gutter.
- 20+ impacts identified on the south facing roof slope.
- 20+ impacts identified on the north facing roof slope.



Figure 21.



Figure 22.

3.4.8 Building #8 (960 – 964 Elizabeth Drive):

- Minimal impact damage to A/C condenser coils.
- Impact damage to gutter and downspouts.
- Improperly driven fastener identified.
- Mechanical damage to shingle identified.
- 12 impacts identified on the northwest facing roof slope.
- 7 impacts identified on the southeast facing roof slope.



Figure 23.

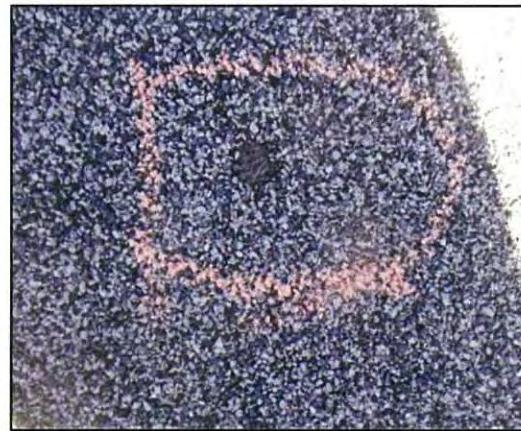


Figure 24.

3.4.9 Building #9 (950 – 956 Elizabeth Drive):

- Impact damage to gutter.
- Part of roof tarped over.
- Mechanical damage to shingle identified.
- 20+ impacts identified on the southeast facing roof slope.
- 20+ impacts identified on the northwest facing roof slope.



Figure 25.

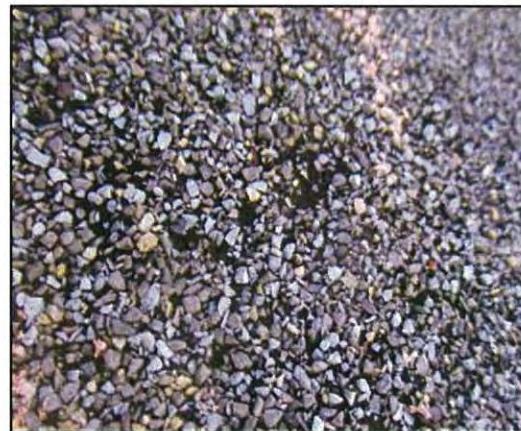


Figure 26.



Figure 27.

3.4.10 Building #10 (940 – 946 Elizabeth Drive):

- Impact damage to gutter.
- Improperly driven fastener identified.
- 20+ impacts identified on the southeast facing roof slope.



Figure 28.



Figure 29.

3.4.11 Building #11 (930 – 934 Elizabeth Drive):

- This building inspected on October 16, 2017 by Brian Johnson, P.E. and Kevin Steinke. The following observations were made at that time:
- Minimal impact damage to A/C condenser coils.
- Impact damage to gutter and downspouts.
- Impact damage to vinyl siding.
- Part of roof tarped over.
- 13 impacts identified on the northwest facing roof slope.
- 20 impacts identified on the southeast facing roof slope.



Figure 30.



Figure 31.



Figure 32.

3.4.12 Building #12 (920 – 926 Elizabeth Drive):

- Minimal impact damage to A/C condenser coils.
- Impact damage to gutter.
- Parts of roof tarped over.
- Missing shingle tabs identified.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the southwest facing roof slope.
- 17 impacts identified on the northeast facing roof slope.



Figure 33.



Figure 34.



Figure 35.



Figure 36.

3.4.13 Building #13 (912 – 918 Elizabeth Drive):

- Impact damage to gutter.
- Part of roof tarped over.
- Missing shingle tabs identified.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the west facing roof slope.
- 20+ impacts identified on the east facing roof slope.



Figure 37.



Figure 38.



Figure 39.



Figure 40.

3.4.14 Building #14 (904 – 910 Elizabeth Drive):

- Impact damage to vinyl siding.
- Impact damage to gutter.
- Part of roof tarped over.
- Differing shingle appearance (possibly weathering) on half of the building.
- Mechanically damaged shingle identified.
- 13 impacts identified on the east facing roof slope.
- 15 impacts identified on the west facing roof slope.



Figure 41.



Figure 42.



Figure 43.



Figure 44.

3.4.15 Building #15 (903 – 907 Elizabeth Drive):

- Impact damage to gutter.
- Minimal impact damage to A/C condenser coils.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the west facing roof slope.
- 20+ impacts identified on the east facing roof slope.

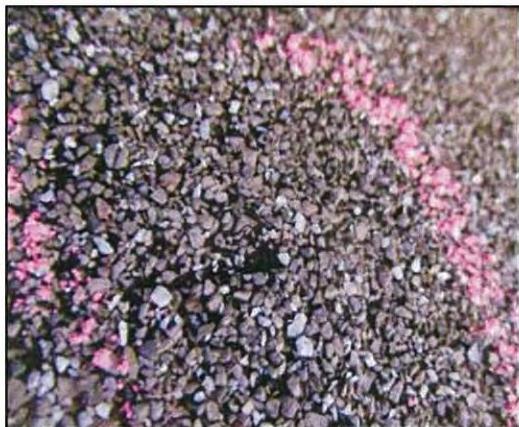


Figure 45.

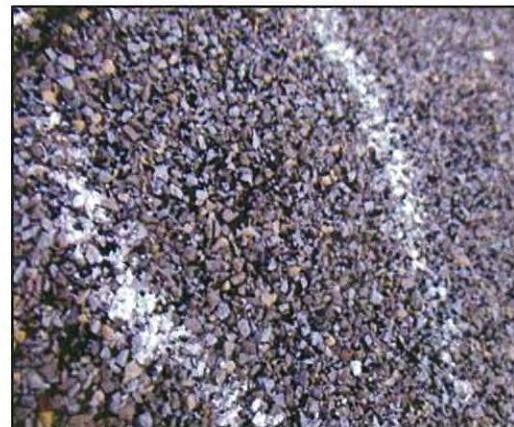


Figure 46.

3.4.16 Building #16 (915 – 921 Elizabeth Drive):

- Impact damage to vinyl siding.
- Impact damage to gutter.
- Missing shingle tab identified.
- Roof tarped over in a few areas.
- Mechanically damaged shingle identified.
- 17 impacts identified on the northeast facing roof slope.
- 20+ impacts identified on the southwest facing roof slope.



Figure 47.



Figure 48.



Figure 49.



Figure 50.

3.4.17 Building #17 (931 – 937 Elizabeth Drive):

- Impact damage to gutter.
- Newer shingles observed on half of the building.
- Mechanically damaged shingle identified.
- Nail pop identified.
- 7 impacts identified on the northwest facing roof slope.
- 7 impacts identified on the southeast facing roof slope.

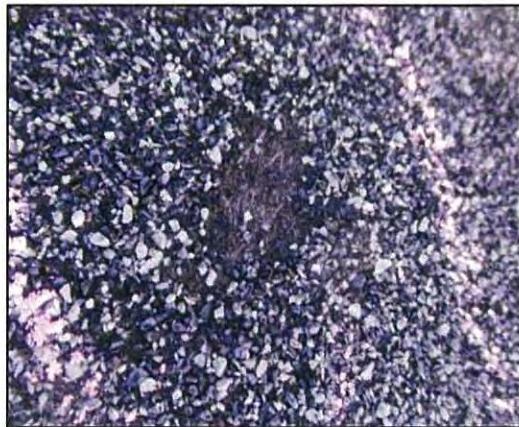


Figure 51.



Figure 52.

3.4.18 Building #18 (941 – 943 Elizabeth Drive & 1540 Yellowstone Drive):

- Impact damage to gutter.
- Roof tarped over in a few areas.
- Missing shingle tabs identified.
- Mechanically damaged shingle identified.
- Nail pop identified.
- 20+ impacts identified on the east facing roof slope.
- 20+ impacts identified on the west facing roof slope.



Figure 53.



Figure 54.



Figure 55.



Figure 56.

3.4.19 Building #19 (1526 – 1532 Yellowstone Drive):

- Impact damage to gutter and downspouts.
- Creased shingle tabs identified.
- 20+ impacts identified on the southwest facing roof slope.
- 9 impacts identified on the northeast facing roof slope.



Figure 57.



Figure 58.



Figure 59.

3.4.20 Building #20 (901 Elizabeth Drive & 1520 – 1524 Yellowstone Drive):

- Impact damage to vinyl siding.
- 11 impacts identified on the northeast facing roof slope.
- 17 impacts identified on the southwest facing roof slope.



Figure 60.

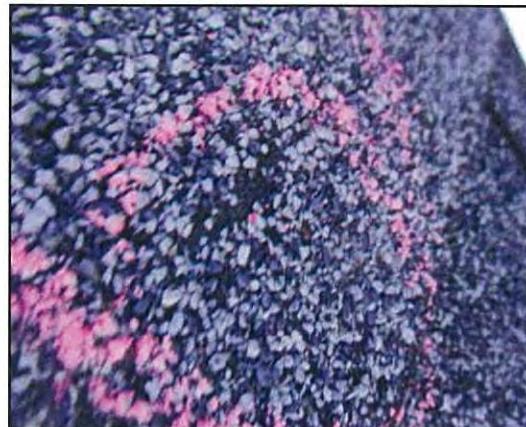


Figure 61.



Figure 62.

3.4.21 Building #21 (902 Elizabeth Drive & 1506 – 1510 Yellowstone Drive):

- Impact damage to gutter.
- Roof tarped over in one area.
- Missing shingle tab identified.
- 20+ impacts identified on the southwest facing roof slope.
- 20+ impacts identified on the northeast facing roof slope.



Figure 63.



Figure 64.



Figure 65.

3.4.22 Building #22 (902 – 910 King Canyon Drive):

- Impact damage to gutter and downspouts.
- Minimal impact to A/C condenser coils.
- Impact damage to vinyl siding.
- Creased shingles identified.
- Detached vinyl siding around window framing.
- 20+ impacts identified on the northeast facing roof slope.
- 20+ impacts identified on the southwest facing roof slope.



Figure 66.



Figure 67.

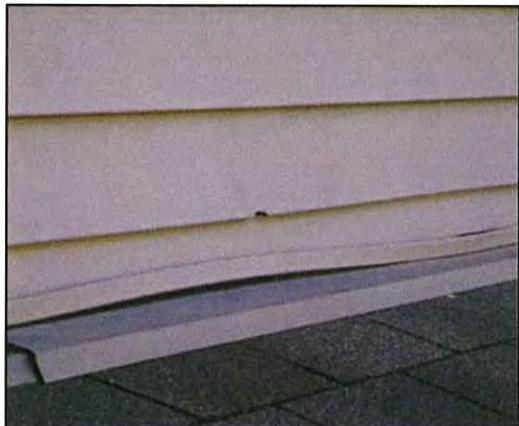


Figure 68.



Figure 69.



Figure 70.

3.4.23 Building #23 (912 – 916 King Canyon Drive):

- Impact damage to gutter and downspouts.
- Minimal impact to A/C condenser coils.
- Nail pop identified.
- 20+ impacts identified on the northeast facing roof slope.

- 20+ impacts identified on the southwest facing roof slope.



Figure 71.



Figure 72.

3.4.24 Building #24 (920 – 926 King Canyon Drive):

- Impact damage to gutter.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the southeast facing roof slope.
- 12 impacts identified on the northwest facing roof slope.



Figure 73.

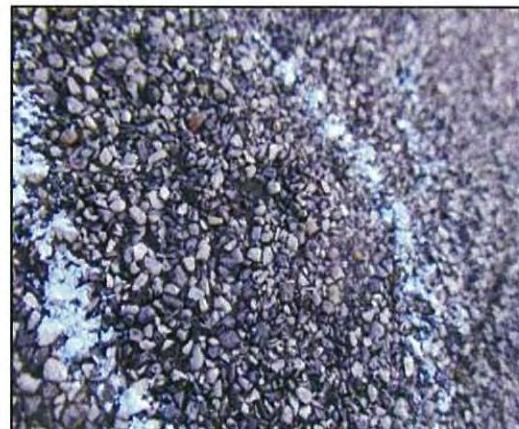


Figure 74.

3.4.25 Building #25 (930 – 936 King Canyon Drive):

- Impact damage to gutter.
- Mechanically damage shingle identified.
- 20+ impacts identified on the northwest facing roof slope.
- 20+ impacts identified on the southeast facing roof slope.



Figure 75.



Figure 76.

3.4.26 Building #26 (911 – 915 King Canyon Drive):

- Impact damage to downspout.
- Minimal impact damage to A/C condenser coils.
- Nail pop identified.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the northeast facing roof slope.
- 20+ impacts identified on the southwest facing roof slope.

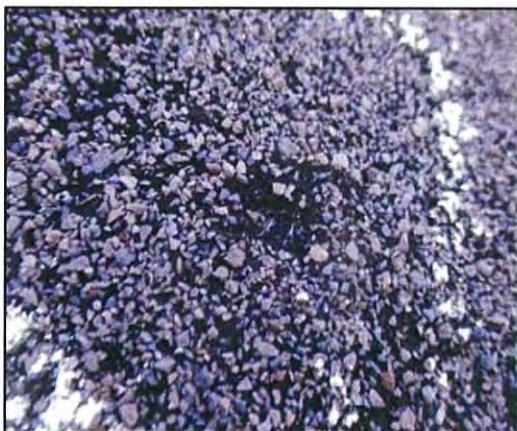


Figure 77.

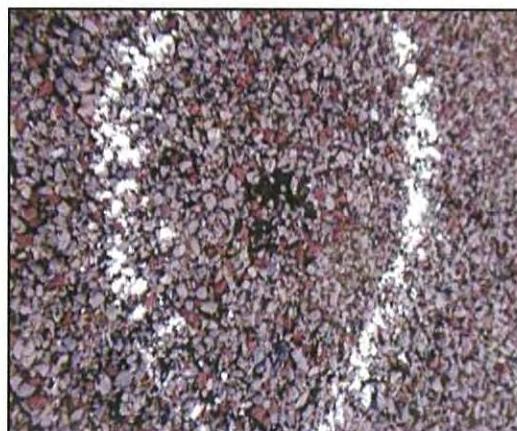


Figure 78.

3.4.27 Building #27 (206, 921, 923 King Canyon Drive & 1496 Yellowstone Drive):

- Impact damage to gutter.
- Minimal impact damage to A/C condenser coils.
- Nail pop identified.
- Mechanically damaged shingle identified.
- 10 impacts identified on the northwest facing roof slope.
- 12 impacts identified on the southeast facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter. The following observations were made at that time:
 - Visible hail damage from hail on roof. No sample squares were done.

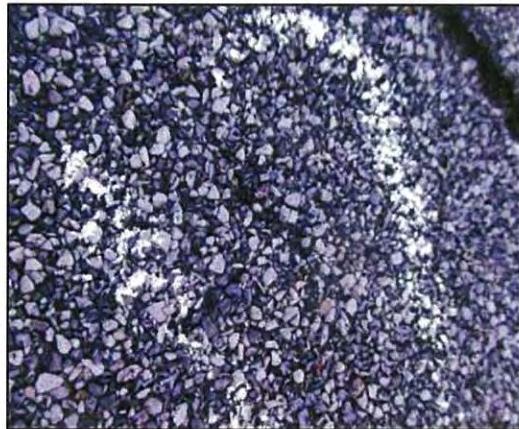


Figure 79.

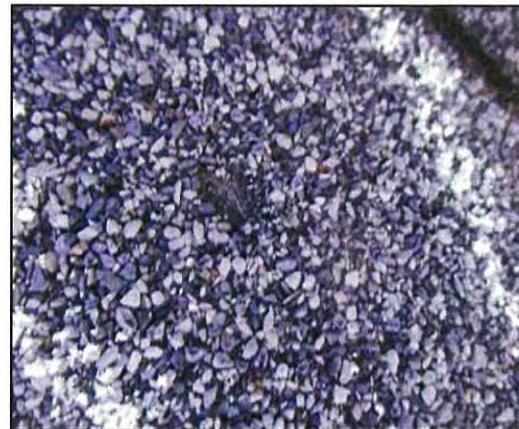


Figure 80.

3.4.28 Building #28 (1490 – 1494 Yellowstone Drive):

- Impact damage to gutter.
- Impact damage to vinyl siding.
- 20+ impacts identified on the southeast facing roof slope.
- 20+ impacts identified on the northwest facing roof slope.



Figure 81.

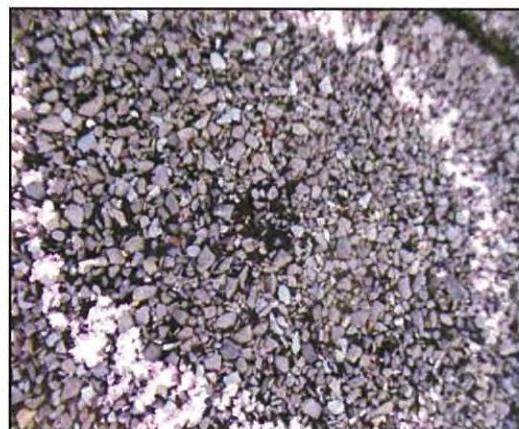


Figure 82.



Figure 83.

3.4.29 Building #29 (1482 Yellowstone Drive & 208 – 212 Black Hill Drive):

- Mechanically damaged shingle identified.
- 9 impacts identified on the southwest facing roof slope.
- 9 impacts identified on the northeast facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter.
The following observations were made at that time:
 - Front: 15 impact locations in 10 x 10 area
 - Back: 16 impact locations in 10 x 10 area

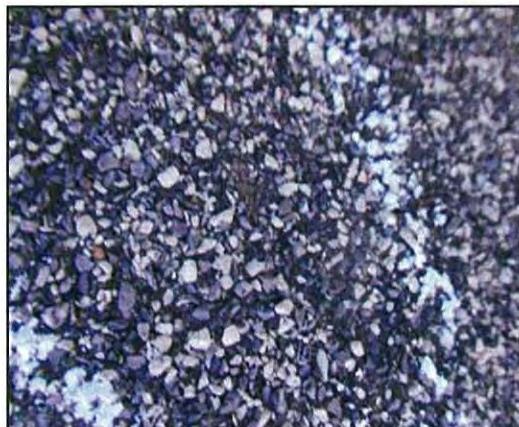


Figure 84.

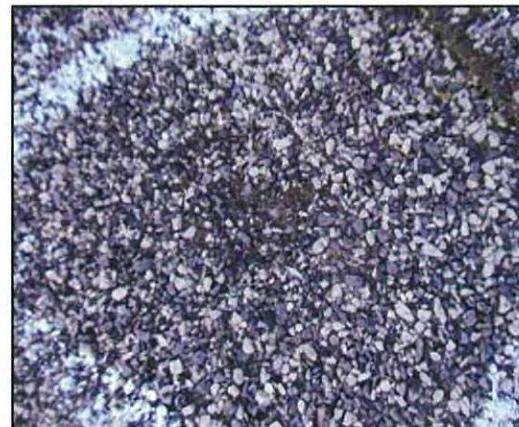


Figure 85.

3.4.30 Building #30 (201 – 207 Black Hill Drive):

- Impact damage to gutter.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the northeast facing roof slope.
- 20+ impacts identified on the southwest facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter.
The following observations were made at that time:
 - Front 10+ impact locations on dormer.



Figure 86.



Figure 87.

3.4.31 Building #31 (209 – 215 Black Hill Drive):

- Impact damage to gutter.
- 15 impacts identified on the southwest facing roof slope.
- 5 impacts identified on the northeast facing roof slope.



Figure 88.



Figure 89.

3.4.32 Building #32 (1456 – 1460 Yellowstone Drive):

- Impact damage to gutter.
- Impact damage to vinyl siding.
- Mechanically damaged shingles identified.
- 20+ impacts identified on the east facing roof slope.
- 20+ impacts identified on the west facing roof slope.



Figure 90.

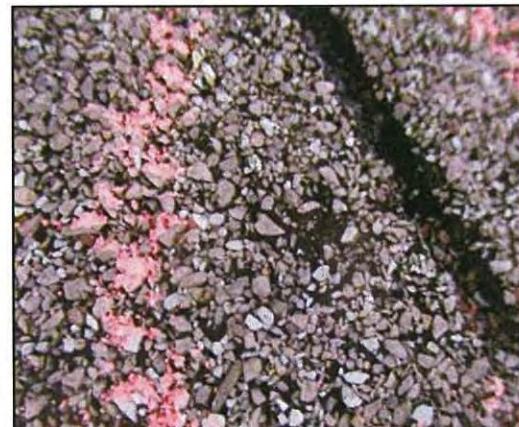


Figure 91.



Figure 92.

3.4.33 Building #33 (1434 – 1440 Yellowstone Drive):

- Detached vinyl siding identified.
- 20+ impacts identified on the southwest facing roof slope.
- 20+ impacts identified on the northeast facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter.
The following observations were made at that time:
 - Front: 12+ impact locations in 10 x 10 area.



Figure 93.



Figure 94.



Figure 95.

3.4.34 Building #34 (1424 – 1430 Yellowstone Drive):

- Impact damage to gutter and downspouts.
- 10 impacts identified on the southwest facing roof slope.
- 12 impacts identified on the northeast facing roof slope.



Figure 96.



Figure 97.

3.4.35 Building #35 (1414 – 1420 Yellowstone Drive):

- 20+ impacts identified on the southwest facing roof slope.
- 20+ impacts identified on the northeast facing roof slope.

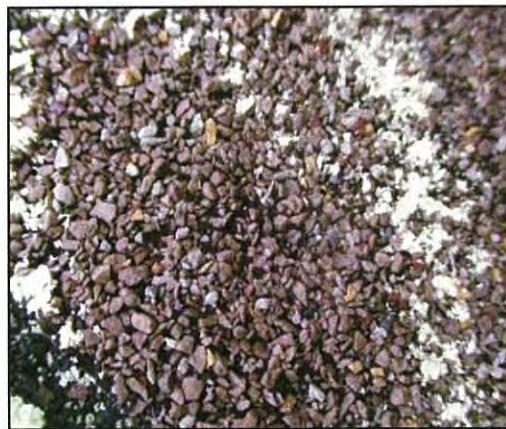


Figure 98.



Figure 99.

3.4.36 Building #36 (1402, 1406 – 1410 Yellowstone Drive):

- 20+ impacts identified on the east facing roof slope.
- 20+ impacts identified on the west facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter.
The following observations were made at that time:
 - Front: 16+ impact locations in 10 x 10 area.
 - Back: 15+ impact locations in 10 x 10 area.



Figure 100.



Figure 101.

3.4.37 Building #37 (1403 – 1409 Yellowstone Drive):

- This building inspected on October 16, 2017 by Brian Johnson, P.E. and Kevin Steinke. The following observations were made at that time:
 - Impact damage to gutter and downspouts.
 - Mechanically damaged shingle identified.
 - Impact damage to metal flashing identified.
 - 13 impacts identified on the east facing roof slope.
 - 12 impacts identified on the west facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter.
The following observations were made at that time:
 - Granular loss in gutter.

- Front: 10+ impact marks in 10 x 10 area.
- Back: many impact marks from hail.
- Back: 2 locations with manufacturing/install damage equaling 2 bundles of shingles.



Figure 102.



Figure 103.



Figure 104.

3.4.38 Building #38 (1411, 1413, 1417, 1419 Yellowstone Drive)

- Impact damage to gutter.
- 20+ impacts identified on the southwest facing roof slope.
- 20+ impacts identified on the northeast facing roof slope.



Figure 105.

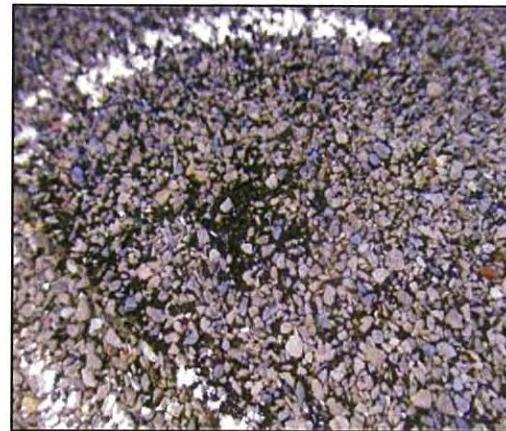


Figure 106.

3.4.39 Building #39 (1421 – 1427 Yellowstone Drive):

- Impact damage to gutter and downspout.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the northeast facing roof slope.
- 20+ impacts identified on the southwest facing roof slope.



Figure 107.

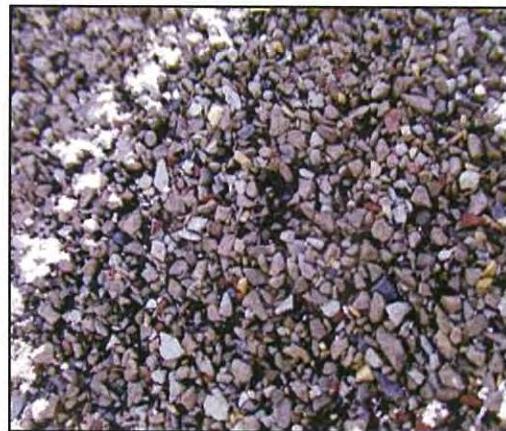


Figure 108.

3.4.40 Building #40 (1431 – 1437 Yellowstone Drive)

- Impact damage to gutter.
- 10 impacts identified on the northeast facing roof slope.
- 15 impacts identified on the southwest facing roof slope.

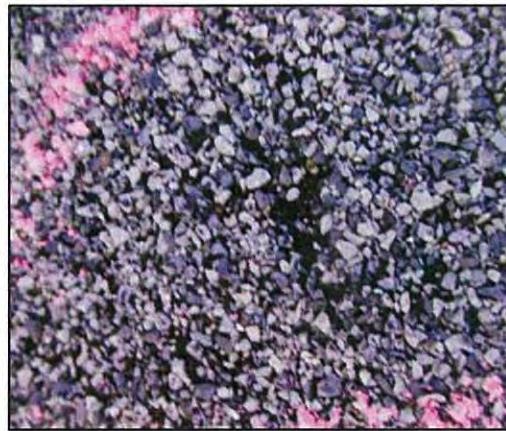


Figure 109.

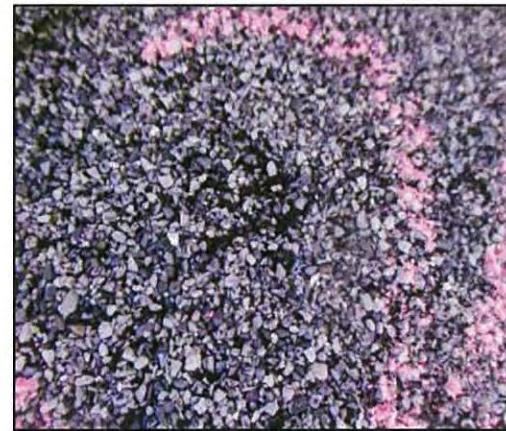


Figure 110.

3.4.41 Building #41 (1441 – 1447 Yellowstone Drive):

- Impact damage to gutter.
- Impact damage to metal flashing.
- Roof tarped over in a few areas.
- Replacement shingles identified.
- 20+ impacts identified on the southwest facing roof slope.
- 20+ impacts identified on the northeast facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter. The following observations were made at that time:
 - Tarps viewed on roof.
 - Wind damage easily seen from ground.



Figure 111.



Figure 112.



Figure 113.



Figure 114.

3.4.42 Building #42 (1463 – 1469 Yellowstone Drive):

- This building inspected on October 16, 2017 by Brian Johnson, P.E. and Kevin Steinke. The following observations were made at that time:
- Impact damage to gutter.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the west facing roof slope.
- 20+ impacts identified on the east facing roof slope.



Figure 115.



Figure 116.

3.4.43 Building #43 (1471 – 1477 Yellowstone Drive):

- Impact damage to gutter and downspouts.
- Detached/displaced piece of vinyl siding.
- 20+ impacts identified on the southwest facing roof slope.
- 20+ impacts identified on the northeast facing roof slope.



Figure 117.



Figure 118.



Figure 119.

3.4.44 Building #44 (1479 – 1485 Yellowstone Drive):

- Impact damage to gutter and downspouts.
- Impact damage to vinyl siding.
- Detached vinyl siding.
- Mechanically damaged shingle identified.
- 20+ impacts identified on the southeast facing roof slope.
- 13 impacts identified on the northwest facing roof slope.



Figure 120.

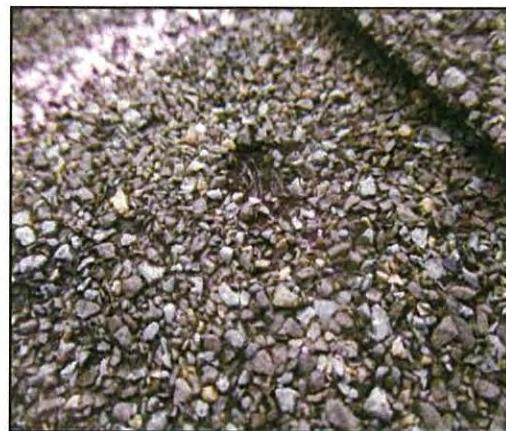


Figure 121.



Figure 122.



Figure 123.

3.4.45 Building #45 (1487 – 1493 Yellowstone Drive):

- Impact damage to gutter and downspout.
- Impact damage to vinyl siding.
- Nail pop identified.
- 20+ impacts identified on the southeast facing roof slope.
- 13 impacts identified on the northwest facing roof slope.

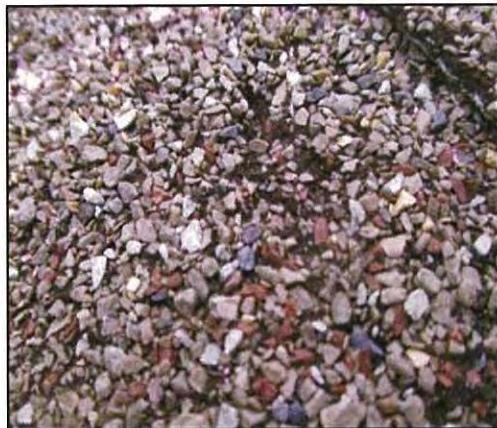


Figure 124.



Figure 125.



Figure 126.

3.4.46 Building #46 (1495 – 1501 Yellowstone Drive):

- Impact damage to gutter and downspout.
- 8 impacts identified on the southwest facing roof slope.
- 10 impacts identified on the northeast facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter.
The following observations were made at that time:
 - Front: 9 impacts from hail in 10 x 10 area.
 - Back: 9 impacts from hail in 10 x 10 area.

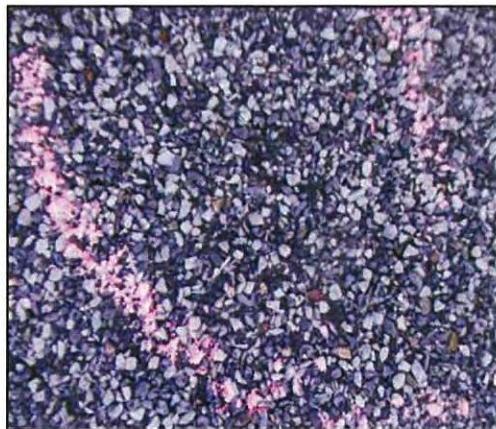


Figure 127.

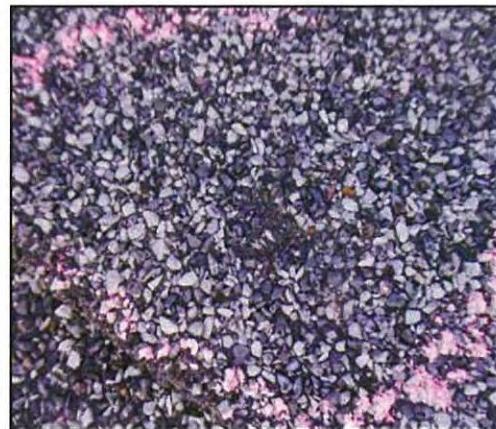


Figure 128.

3.4.47 Building #47 (1503 – 1507 Yellowstone Drive):

- Impact damage to gutter.
- Impact damage to vinyl siding.
- Detached vinyl siding.
- 20+ impacts identified on the northwest facing roof slope.
- 20+ impacts identified on the southeast facing roof slope.



Figure 129.

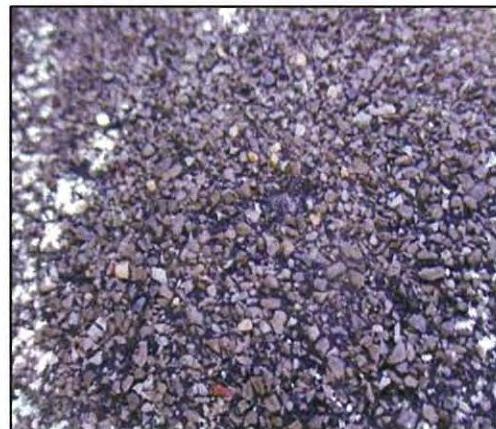


Figure 130.



Figure 131.

Figure 132.

3.4.48 Building #48 (1509 – 1515 Yellowstone Drive):

- Impact damage to gutter.
- Impact damage to vinyl siding.
- 20+ impacts identified on the northwest facing roof slope.
- 20+ impacts identified on the southeast facing roof slope.
- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter. The following observations were made at that time:
 - Front: 14+ impacts from hail in 10 x 10 area.
 - Back: 20+ impacts from hail in 10 x 10 area.



Figure 133.

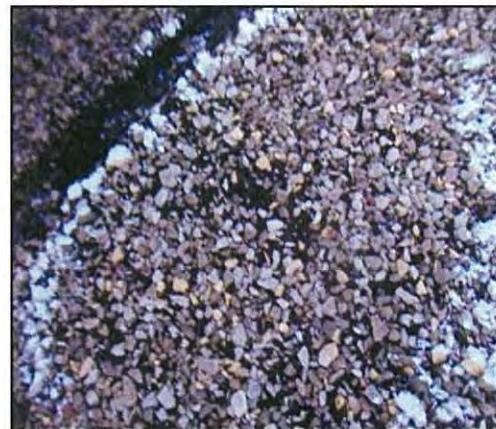


Figure 134.



Figure 135.

3.4.49 Building #49 (1517 – 1523 Yellowstone Drive):

- Impact damage to gutter.
- Impact damage to vinyl siding.
- 6 impacts identified on the northwest facing roof slope.
- 6 impacts identified on the southeast facing roof slope.

- This building also inspected a 2nd time, on November 9, 2017 by Tom Irmiter. The following observations were made at that time:
 - Front: 15 impacts in 4 x 12 area.
 - Back: total of 3 impacts on entire slope.

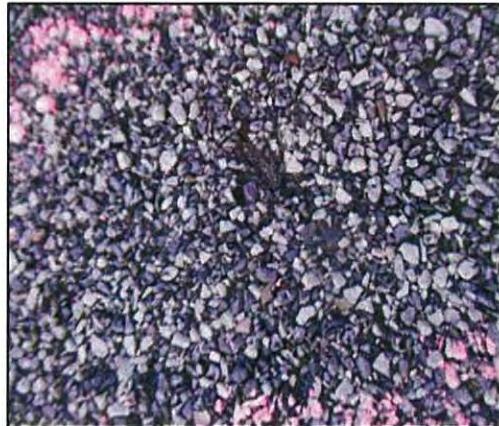


Figure 136.

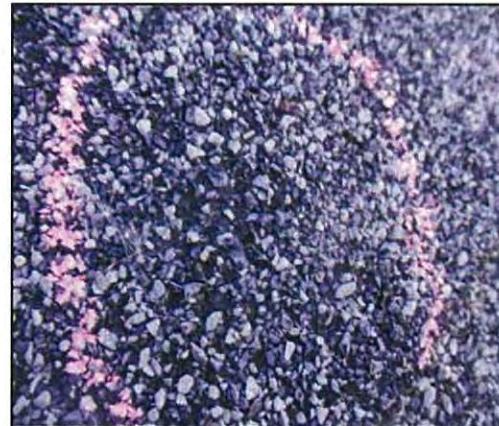


Figure 137.



Figure 138.

3.4.50 Building #50 (1525 – 1531 Yellowstone Drive):

- Impact damage to gutter and downspout.
- Impact damage to vinyl siding.
- Tarped off sections of roof slopes observed.
- Missing shingle tab identified.
- Detached vinyl siding.
- 20+ impacts identified on the northwest facing roof slope.
- 20+ impacts identified on the southeast facing roof slope.



Figure 139.



Figure 140.



Figure 141.



Figure 142.

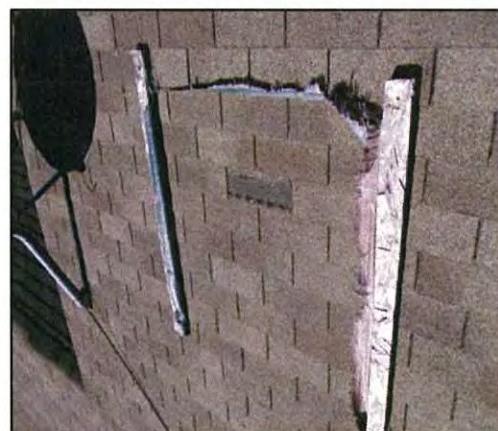


Figure 143.

3.4.51 Building #51 (1533 – 1539 Yellowstone Drive):

- Impact damage to gutter.
- Tarped off sections of roof slopes observed.
- Missing shingle tab identified.
- 20+ impacts identified on the southeast facing roof slope.
- 16 impacts identified on the northwest facing roof slope.

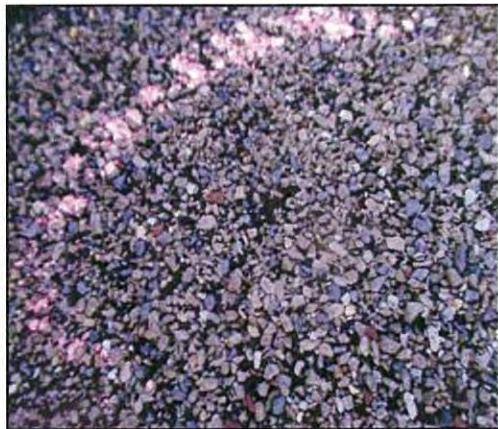


Figure 144.



Figure 145.



Figure 146.



Figure 147.

4.0 Causation Statement:

- 4.1 Based upon physical evidence collected from the site inspection and roof assessment, we have concluded that the roofs, roof appurtenances, siding, fascia, gutters, downspouts, some window screens, and some air conditioning condenser units on this property are damaged as a direct result of the wind and minimum size 1" hail that fell at the site on August 2, 2015.

Indentations in shingles, granular loss, and impact damage to siding and soft metals were consistent with the 1" hail reported in the area by NOAA. Physical damage to the shingles in the form of substantial granular loss and exposed binder, mat and mat fibers have dramatically shortened the life of the shingles and created potential areas for water intrusion (see photo logs).

Damaged A/C units on the ground are also present on the site. We attribute the damage to these units to the hail event. This damage can be combed.

Based upon our training, education, experience, and a reasonable degree of building science or engineering certainty, it is our opinion that the impact damage we observed to the exterior of the buildings are related to the storm event. On the reported date of loss, there was sufficient size hail and wind to cause the observed damages.

It is our opinion, based on our observations that the damage is not from the 2010 or 2007 events mentioned in the RCL report. Other possible dates were considered with the SWDI tool, but in our opinion the age and progression of the damage is consistent with the 2015 event.

Failure to replace the damaged roofs and siding at the property will result in additional damage due to water intrusion. In our opinion, based on the age of the buildings and changes to the building and energy codes from the date of original construction to the date of loss, and specific requirements from the Village of Streamwood, additional costs to repair will be required to meet the current required code or manufacturer's installation instructions.

5.0 Village of Streamwood Requirements:

5.I Village of Streamwood Code Requirements for Reroofing

Permit Procedures:

1. Submit a completed permit application.
2. If a contractor is used, s/he must be licensed with the Village.

Specifications:

1. No more than two roofing applications are permitted. **The existing 3/8" sheathing is no longer acceptable and must be replaced with ½" CDX Plywood minimum in all cases.**
2. If rafters are 24" on center, 5/8" plywood must be installed with spacers (plyclips) (*IRC-R803.1).
3. Corrosion resistant nails or staples shall be used, four (4) nails or staples per shingle (*IRC-R905.2.5; R905.2.6).
4. When re-roofing, all damaged 1/2" or 5/8" roof sheathing must be replaced. New flashing shall be used where applicable (*IRC-R907.3 (1)). **OSB sheathing is not allowed in roof applications.**
5. **Attic ventilation shall be as follows:** One square foot (1' sq.) of free vent area should be provided for every 150 square feet (150' sq.) of attic. A two and one quarter square feet (2-1/4') gable vent, with louvers and screening, would have one square foot (1') of free vent area. The required vent area can be reduced by half (1 to 300) if half of the vents are soffit vents in the eaves and the other half are at least three feet (3') off the attic floor (*IRC-R806). Insulation baffles are required for eave venting.

6. Shingles shall be installed as follows: Slopes less than four inches (4") in twelve inches (12") but not less than two inches (2") in twelve inches (12"): Nominally double-coverage asphalt shingles may be installed on slopes as low as two inches (2") in twelve inches (12"), provided the shingles are approved self-sealing shingles. An ice barrier that consists of a self-adhering polymer modified bitumen sheet (ice and water shield), applied as required in *IRC-R905, shall be used in lieu of normal underlayment and extend from the eave's edge to a point at least twenty-four inches (24") inside the exterior wall line of the building. Shingles shall not be used on roofs with slopes less than two inches (2") in twelve inches (12") (*IRC-R905.2.7).

7. A drip edge shall be installed along the edges of all roofs (*IRC -R905.2.8.5).

8. Please note Village Code 9-5-2-3D subsection R324 states:

No permit shall be issued for new roofing or siding unless the roofing material or siding, as the case may be, on the entire structure is replaced. Where the structure consists of multi dwelling units, the improvement for all of the dwelling units shall be replaced at the same time whenever possible. Where the covenants and restrictions on the property require the exterior of the units to have consistent colors and materials, every attempt shall be made to match the existing colors and materials. **If the entire multi-family structure is not replaced at the same time, and subject to subsection D2 herein, a letter of approval is required by the other dwelling unit owners prior to the permit being issued.**

Exceptions: In addition to any other requirements contained herein, permits for partial replacement of roofing and/or siding in all structures may be allowed with written approval of the building official when the following conditions are met:

- a. A siding evaluation report is submitted from ITEL Laboratories, Inc.
- b. The report shall indicate that the original product is still available.
- c. The report shall indicate that the color match is a 1 or 2 value on the siding match chart.
- d. No less than one side of the structure is going to be replaced.

5.2 Village of Streamwood Code Requirements for Residing

Permit Procedures:

1. Submit a completed permit application.
2. If a contractor is used, s/he must be licensed with the Village.
3. Indicate the type of siding to be used and areas to be covered..

Specifications: *Please note that these specifications are general and not comprehensive. Additional changes or suggestions may be made by the inspectors to ensure that the construction is in compliance with Village Codes.*

1. All exterior wall surfaces shall be covered with an approved water repellent membrane (Tyvek) or approved equivalent. The membrane shall be installed in a complete assembly with a minimum number of seams. All seams shall be lapped a minimum of six inches (6"). Any sides or gables without sheathing require installation of a minimum of $\frac{1}{2}$ "

plywood or OSB sheathing (*VC 9-5-3-7 subsection R703.2.1). All seams, doors and windows shall be fastened with manufacturer's approved tape. (*VC 9-5-3-7 subsection R703.2.1) All wood soffit fascia and window trim materials shall be primed on all sides prior to installation (*VC 9-5-3-9 subsection R903.5).

2. A Tyvek inspection is required prior to the siding being installed. Please note that 24 hours notice is required for all inspections.

3. The address numbers shall be placed back on the house. Numbers shall be a minimum of 4" high in a contrasting color.

Covering Existing Siding:

If your walls need insulating or the existing siding is in disrepair, it is usually better to strip off the siding and install new sheathing and siding. If this is not necessary, you need to prepare the old siding for the new siding

Remember the following pointers when installing siding:

1. Joints should be staggered so that a vertical row does not create a channel for sustained water flow.
2. Caulk long, vertical joints so that water flowing down the face of the siding will not be wicked into joints.
3. Nails, flashing, and all metal should be corrosion resistant, either made of aluminum or high-quality galvanized steel (*IRC-R703.4).
4. Make sure the walls, crawl space and attic have adequate ventilation so that moisture does not accumulate (*IRC-R806.1, R408.1).
5. External water meter reader is no longer in use and shall be removed. Wire shall be cut off at house and reader unit discarded.

Before final inspection:

1. All vent caps, electrical fixtures and devices, and house numbers shall be installed. All penetrations for piping or other mechanics shall be sealed with caulk.
2. Site shall be clean and free of any extra material or debris.

Please note Village Code 9-5-2-3 subsection R325 states:

1. No permit shall be issued for new roofing or siding unless the roofing material or siding, as the case may be, on the entire structure is replaced. Where the structure consists of multi dwelling units, the improvement for all of the dwelling units shall be replaced at the same time whenever possible. Where the covenants and restrictions on the property require the exterior of the units to have consistent colors and materials, every attempt shall be made to match the existing colors and materials. If the entire multi-family structure is not replaced at the same time, and subject to subsection D2 herein, a letter of approval is required by the other dwelling unit owners prior to the permit being issued.

2. Exceptions: In addition to any other requirements contained herein, permits for partial replacement of roofing and/or siding in all structures may be allowed with written approval of the building official when the following conditions are met:

- a. A siding evaluation report is submitted from ITEL Laboratories, Inc.
- b. The report shall indicate that the original product is still available.

- c. The report shall indicate that the color match is a 1 or 2 value on the siding match chart.
- d. No less than one side of the structure is going to be replaced.

6.0 Review of Roofing Consultants Roof Investigation Report:

- 6.1 We have reviewed the Roofing Consultants Roof Investigation Report. The conclusion section of the report states:

“It is the professional opinion of this firm that all shingles sustaining factures and bruises warrant replacement and any marks representing granule displacement wouldn’t warrant any work. As indicated however, if the insurance carrier also deems granule displacement marks as damage, then we would suggest replacement of certain slopes as indicated...The aluminum gutters were indented by hail. Isolated downspouts were indented as well...There is evidence of minimal wind damage to the shingles in the complex. Generally, the damage was in the form of individual tabs either folded/creased or dislodged. Certainly, these individual tabs could be replaced.”

Comment: The first sentence makes no sense. Fractured and bruised shingles typically have granular loss. In our opinion, chipped shingles, exposed mat or binder, and permanent deformation with loss of granules constitutes physical damage to the shingle. Roof damage counts conducted by RCI are low and do not accurately reflect the damage caused by hail. In our opinion, damage observed and documented by FBS from the August 2, 2015 storm event warrants full replacement of the roofing and siding. Village of Streamwood amendments indicate that tab replacement, slope replacement or replacing individual shingles as suggested by RCL will not be acceptable and a permit will not be given for such a proposed work.

7.0 Conclusions:

7.1 Patching in repairs to shingles

- 7.1.1 The Village of Streamwood amendments do not allow partial repair, slope replacement, or patching in shingles.
- 7.1.2 We do not advocate patching in to repair only damaged shingles. Proper repair (patching in) of the existing shingle requires a manufacturer’s ESR and an approval of the repair from the Building Official (in the absence of a building official, a registered design professional should consider if this is acceptable, and issue a stamped and sealed repair document showing the repair).
- 7.1.3 The manufacturer has not been identified, making matching unlikely. Manufacturer should also be identified so their repair requirements can be followed.
- 7.1.4 Damage to roof penetrations (vents, turbines, roof jacks) removal and replacement will require removal of shingles and these shingles cannot be reinstalled.

- 7.1.5 While replacing individual shingles is financially appealing, there are multiple technical problems with such an approach that we cannot recommend “patching in.” These include:
- Prior to attempting any repair brittle testing should be performed. In our opinion, shingles will fail these tests.
 - Manufacturer has not been identified, repair cannot follow manufacturer’s instructions, violating code.
 - Removal of hail damaged and wind damaged individual shingles will be required.
 - Removal of adjacent shingles or breaking sealant of multiple adjacent shingles will be broken and will require resealing (e.g. CertainTeed indicates three courses to be removed for each replaced shingle).
 - Sealant will have to be approved by manufacturer (new and original shingles) and building official.
 - Sealing holes from fasteners removed will be required to protect underlayment (e.g. CertainTeed, although CertainTeed recommends re-using the nail holes—a suggestion we find ill-advised as firstly, we would want a nail into relatively virgin wood to provide normal nail withdrawal values, which would require altering shingle coursing, or nailing high/low or offset and then filling the existing nail hole in the underlayment with sealant). Altering nail locations is acceptable to some shingle manufacturers but verification will be required.
 - Comparatively high labor costs.
 - Matching may not be possible.
 - Repair does not appear to be tested per ASTM D6381, D3161, or D7158.
 - Underlayment cannot be damaged during repair.
 - Local amendments forbid patching in.
 - Roofing contractor may refuse to warrant their work, or may be unwilling to perform the work without a waiver of warranty by the Owner.
- 7.2 We attribute this damage to the August 2, 2015 storm event. Damages include hail bruises, penetration to the mat and mat exposure to the surface of shingles. Damage was typically directional. In our opinion, all the roofs sustained damage warranting full replacement.
- 7.3 The hail event damaged and dented the lighter gauge metal and plastic appurtenances (vents, etc.) on the roofs of the buildings. Damage to roof vents was not extensive and typically involved both sides of a roof slope exposure. We attribute this to the location of the vents at the top of the roof. We attribute this damage to the storm event. These damaged components require replacement. To do this work, additional shingles on buildings will be required to be removed adding to the matching issues already presented.
- 7.4 The hail event damaged and dented the downspouts and some gutters on the buildings. We attribute this damage to the storm event. Damaged gutters and downspouts require replacement, which will involve shingle disruption at the eave if the gutter is under the gutter apron as is typical.
- 7.5 The damage is randomly distributed across the roofs, which is typical of hailstorms. Some exposed roof flashing was impact damaged by the hail. In our opinion, the damage is significant, affecting the majority of the roof areas. In our opinion, the roofs on the

buildings were installed correctly and were performing adequately prior to the storm event. There were no reported leaks prior to the storm event that we are aware of.

- 7.6 The existing roof deck sheathing is a mix of 7/16-inch OSB and plywood. Reuse of the roof decking in place may require the installation of additional support at panel ends that currently do not have H-clips. To accomplish this, removal of sections of roof decking would be required. As an alternative blocking could be added on the interior of the attic at the panel end joints that are not supported.¹
- 7.7 Replacement of roof will involve removing all flashing, including at roof-wall intersections to either inspect for corrosion and secure approval from the building official to leave in place/reinstall, or to remove and replace it. Removal (or inspection) of the flashing, which extends up the wall, will require removal of additional siding. In addition, all siding is in direct contact with the roofing materials at wall to roof intersections. Current roofing manufacturers require a separation of the siding and the shingles.

J-Channel Over Roof Lines

Install the flashing before the J-channel to prevent water infiltration along the intersection of a roof and wall.

- Keep the J-channel a minimum of 1/2" (12.7mm) from the roofing material. Chalk a straight line up the roof flashing to guide J-channel installation. Tip: You can use another J-channel laid over the shingles as a spacer to create the straight line desired.
- Overlap the J-channel (lapping the upper piece over the lower piece) if it is necessary to use more than one piece. See Fig. 54 on page 29.
- Extend the J-channel past the edge of the roof in order to ensure proper runoff. A diverter can be used; see Fig. 44 and 45 on page 26.
- With dark shingles, or a south or west exposure, it is recommended to either use a metal J-channel or to install the vinyl J-channel as far away from the roofing as is aesthetically acceptable, having first ensured that there is sufficient flashing behind the J-channel to prevent water infiltration.
- Fasten the nail, screw, or staple that is closest to the roof line at the far end of the nail hem slot, to ensure that siding will expand away from the J-channel (Fig. 35).

NOTE: Vinyl J-channels should not be in direct contact with roofing shingles, since the shingles may transfer enough heat to the vinyl J-channel to cause its distortion.

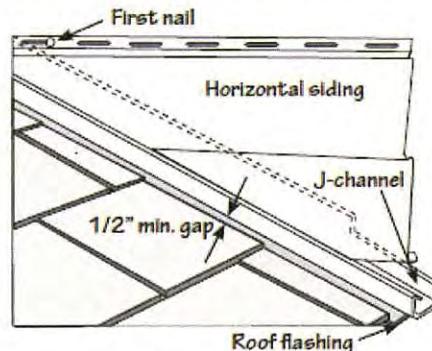


Figure 35.

Source: 2017 Vinyl Siding Installation Manual

- ¹ Panel Edge Support for Narrow Width Roof Sheathing, APA Technical Note R275A, Aug 1997.

- 7.8 In addition, all known manufacturers of ice barriers do not permit installation over existing ice barriers and the existing ice barrier is expected to be damaged from the shingle removal process. If removal of the ice barrier damages the sheathing in the eaves and valleys, this sheathing will have to be replaced. Per communication with John Peterson, Village of Streamwood, $\frac{1}{2}$ " plywood (with H clips) is the minimum sheathing acceptable to Streamwood. This will create a $\frac{1}{16}$ " thickness difference between existing $\frac{7}{16}$ " OSB and $\frac{7}{16}$ " plywood in place and the new thicker $\frac{1}{2}$ " plywood replacement material. Given this will create a disturbance in the setting elevation of the shingles, any roof with damaged sheathing will have to be fully replaced to provide a level, flat surface for shingle installation.
- 7.9 Vinyl siding was damaged. We have been informed that matching siding could not be found. Due to this, and the requirements from the Village of Streamwood, the damage caused by the storm event will require complete replacement of the vinyl siding at the affected buildings.
- 7.10 Impact damage to A/C condenser coils caused by hail will require replacement of the coils or to have the coils combed out. If coils are replaced, replace with OEM coils. If OEM coils are not available, replace units.
- 7.11 Installation of a continuous weather barrier is required on the exterior walls by the Village of Streamwood. In our opinion, this will require all exterior doors and windows to be detached and reset to comply with this requirement. Fenestrations should be verified against energy code before they are reinstalled.
- 7.12 Author's Statement: This report was co-authored by Brian Johnson P.E. and Thomas Irmiter, president of Forensic Building Science. Both Mr. Johnson and Mr. Irmiter conducted site visits to the property and performed inspections. Mr. Johnson contributed to the causation analysis of the report. Mr. Irmiter contributed to the causation, scope of repairs and specific industry standards and requirements within the building codes and ordinances. Both Mr. Johnson and Mr. Irmiter reviewed each other's contributions to this report.

8.0 Requirements/Recommendations:

Based on the findings during the limited investigation we recommend the following steps be taken.

In our opinion, these buildings meet the definition of townhouse as adopted and amended by the Village of Streamwood.

Note: Townhomes generally can be permitted under either the IBC or the IRC, but are most commonly permitted as IRC.

Building separation requirements under R317:

Townhouses (R317.2) amendment requires having a two-hour wall separating the units. The local amendment requires this separation wall to be built of masonry or concrete. The existing wall is expected to be light framing (i.e. dimensional lumber). If this provision is enforced during repair, it will affect cost and schedule significantly.

- 1) On all buildings, remove all layers of roofing and underlayment to expose the roof sheathing.
- 2) Remove ice barrier.
- 3) Replace any damaged roof sheathing.
- 4) Amend dead valley (approximately one foot long) on Building 37.
- 5) Remove sufficient siding at the roof-wall jump for the building official to inspect the flashing, or remove sufficient siding this location to replace flashing.
- 6) Note: Removal of wall siding to examine and secure reapproval of flashing may require additional flashing (i.e R903.2.1 at wall and roof intersections (i.e. a kickout flashing).
- 7) Secure approval for re-use of existing roof sheathing (OSB and plywood is expected) for installation of new underlayment from Building Official.
- 8) Village of Streamwood requires $\frac{1}{2}$ " plywood with H clips for any new roof sheathing or replacement roof sheathing.
- 9) Verify existing ventilation meets current code. Install additional vents as required to meet code requirements and shingle manufacturer's requirements.
- 10) Install code compliant (and/or shingle manufacturer required) roofing underlayment per Village of Streamwood.
- 11) Install code compliant ice dam protection membrane (and/or asphalt shingle manufacturer required) to replace existing. Extend 24" horizontally from inside face of interior wall (IRC R905.2.7.1), unless local code and manufacturer does not require. **Note: Install over existing ice dam protection membrane must be acceptable to new membrane manufacture (i.e. in the ESR). We have not found any manufacturer that allows this, thus removal of any previous ice dam protection membrane will be required as mentioned above.** If the roof sheathing is damaged by removal, it will have to be replaced. Ice protection membrane is generally slippery and some manufacturers (Owens Corning Weather Lock G) recommend fall protection per OSHA 20 CFR 1926.500).
- 12) Replace roof jacks, vents, and other roof items (more cost effective than removing, securing approval from Building Official to reinstall).
- 13) Replace roof flashings, which is more cost effective than securing re-approval for reinstallation of non-damaged materials.
- 14) Install metal valleys where applicable.
- 15) Replace damaged gutters and downspouts. Review gutter and downspouts location and sizing per SMACNA Asphalt Sheet Metal Manual or other similar reference. Such a change will likely be a minor cost. We do not recommend draining upper roof areas onto lower roof areas, or concentrating downspouts near walking surfaces like sidewalks.
- 16) Install minimum 30-year standard three-tab shingles. Verify with Building Official that class "A" shingles are not required.
- 17) **At roof wall intersections:** Verify weather resistive barrier the full height of this wall. Where siding is removed to inspect step flashing for reuse or replacement, a weather resistive barrier must exist. If a WRB is absent, due to overlap requirements (6" at joints, R703.2) where wall hits a vertical corner, this

- provision forces removal of vertical corner to wrap weather resistive barrier to next side, remove vinyl and continue. Due to the construction of these units, removal of all siding will be required to install the WRB. Note: Where siding was removed a weather resistive barrier (Tyvek) was not always found.
- 18) Remove and replace all damaged vinyl siding. If matching siding is not available, all siding on the affected elevation should be replaced per Village of Streamwood requirements.
 - 19) Where missing or damaged, install Tyvek weather resistive barrier per manufacturer's installation instructions, review retrofit install document with building official. If acceptable, follow that document, if not acceptable, remove windows and doors, verify they meet energy code, install flashing per Tyvek and reinstall windows and doors.
 - 20) **Energy code requirements have not been reviewed. Scope of work for this project is structural only. Integration of existing building systems with vapor retarders, application of sealants, flashing and other items are the responsibility of the contractor.**
 - 21) Alternate construction techniques may be acceptable, provided a licensed design professional approves and signs and stamps the plans and/or shop drawings for these repairs. Means and methods are the Contractor's responsibility.
 - 22) Stability during construction is the responsibility of the Contractor. Structure as detailed is intended to be stable once all sheathing and fasteners are in place.
 - 23) Conform with any special inspection and testing schedules issued by the engineer.

Discovery is ongoing. Additional testing and inspections may need to be performed and additional and/or supplemental information and opinions may be contained in future reports issued by Forensic Building Science, Inc. This report is the exclusive property of the client noted previously and cannot be relied upon by a third party. Copies of this report are released to third parties only by written permission of the client.

Please feel free to contact our office should you have any questions or need additional information.

Respectfully submitted,



Digitally Signed

Tom Irmriter, President Forensic Building Science, Inc.
Building Causation, Code and Damages Consultant

November 16, 2017

Date



November 16, 2017

Ryan Nierengarten

Date

Director of Field Operations, Forensic Building Science, Inc.

DuPont Tyvek Certified Installer

Certified Vinyl Siding Installer (VS1 - Vinyl Siding Institute) ID# 18026

Haag Certified Roof Inspector – Residential (Jan. 2012 to Jan. 2017) ID#201201177